

**GANPAT UNIVERSITY**  
**B. Tech. Semester IV (EC)**  
**CBCS Regular Examination May-June 2013**  
**2EC405 Digital Design using HDL**

Max. Time: 2 Hrs.]

[Max. Marks: 35

**Instructions:**

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

**SECTION-I**

- Q:1** (A) Explain gate level 4x1 multiplexer. Write a verilog program and related test bench to design and test it using HDL. 3
- (B) What are the basic components of a module? Which components are mandatory? 3
- (C) Give the difference between blocking and non blocking assignment in behavioral modeling with suitable example. 3
- Q:2** (A) Mention the work of following keywords. 3
1. \$display
  2. \$monitor
  3. reg & wire
- (B) Explain the following loops with suitable example: 3
1. Repeat
  2. For
  3. While
- (C) For the following values of P, Q & R find out the result for expressions 3
- $P=4'b1010, Q=4'b1110$  and  $R=4'b1ZXX$ .
1.  $\&P$
  2.  $Q \ll 2$
  3.  $P! = Q$
  4.  $P == R$
  5.  $P \sim \wedge Q$
  6.  $\{2\{P\}, 3\{Q\}, R[0], R\}$

**OR**

- Q:2** (A) List levels of design abstraction with suitable example. 3
- (B) Write a verilog code for following digital circuit using behavioral modeling : 6
1. 2 to 4 decoder
  2. JK FlipFlop

**SECTION-II**

- Q:3** (A) Explain the importance of HDLs compared to traditional schematic based design. 4
- (B) What are the methods for number specification in verilog HDL? 4
- (C) Are the following legal strings? If not, write the correct strings. 3
- "This is a string displaying the % sign"
  - "out = in1 + in2"
  - "Please ring a bell \007"
- Q:4** (A) Discuss various data types used in verilog HDL with appropriate examples. 3
- (B) Draw the waveform generated by simulating the following assign statement and also explain the waveform. 3
- assign #10 out = in1 & in2; // Delay in a continuous assign**

**OR**

- Q:4** List and explain with examples the following operators. 6
1. Arithmetic Operators.
  2. Logical Operators.
  3. Relational Operators.

**End of Paper**